

Total Pages—4 4th SS—CHEM(Core-VIII)
(Reg)

2019

CHEMISTRY

(Inorganic Chemistry-III)

[Core]

Paper – VIII

Full Marks : 60

Time : $2\frac{1}{2}$ hours

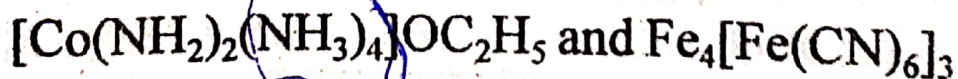
Answer all questions

The figures in the right-hand margin indicate marks

GROUP – A

1. Answer all questions : 3 × 4

(a) Write the IUPAC name of the following
coordination compounds :



(Turn Over)

- (b) Why most of the transition metals are paramagnetic ? Explain.
- (c) Name the elements in the first transition series with their atomic number.
- (d) Write short note on the enzyme carboxy peptidase.

GROUP – B

Answer all questions

2. (a) Gives the postulates of Werner's coordination theory. 8
- (b) Explain the isomerism in diammine dichloride platinum (II). 4

Or

- (a) What are labile and inert complexes ? Both the terms Labile and inert are relative. Explain the rule which helps to explain them. 8
- (b) Write a notes on geometrical isomers in coordination compounds of coordination number-4. 4

3. (a) What are transition elements ? Discuss the various valencies complex formation of these elements with examples. 10
- (b) Write the electronic configuration of Cu-29. 2

Or

- (a) "Although the number of electrons in the outer-most level in transition elements is the same (as 1 or 2) as in alkali and alkaline earth metals, yet the transition elements are much less reactive." How would you account for it ? 8
- (b) Explain with reason why compounds of transition metals are generally coloured ? 4
4. (a) How would you account for + 2, + 3 and + 4 oxidation states of Titanium ? Which of these state is most stable and why ? 6
- (b) How does Titanium occurs in nature ? Discuss the general chemical behaviour. 6

Or

- (a) Discuss the general chemical behaviour of vanadium. How does vanadium react with strong oxidising acid, molten alkalies at elevated temperatures ? 6
- (b) What are the properties of chromium ? Which account for its wide spread use in chromium plating ? Discuss briefly chrome-plating. 6
5. (a) What is meant by Lanthanide contraction ? Give causes and consequences of Lanthanide Contraction. 6
- (b) Describe ion-exchange process to separate Lanthanides. 6

Or

- (a) Discuss the biological role of Mercury, Lead, Cadmium in details. 6
- (b) Explain the chemistry of separation of Neptunium, Plutonium and Americium from Uranium. 6
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Total Pages—4

4th SS—CHEM(Core-IX)
(Reg)

2019

CHEMISTRY

(Organic Chemistry - III)

[Core]

Paper — IX

Full Marks : 60

Time : $2\frac{1}{2}$ hours

Answer all questions

The figures in the right-hand margin indicate marks

GROUP — A

1. Answer all questions :

3 × 4

(a) How can you distinguish 1°, 2° and 3° amines using Hinsberg's reagent ?

(b) How can you prepare benzene from benzene diazonium chloride ?

(Turn Over)

(2)

- (c) Compare the basic character of pyrrole and pyridine.
- (d) What are alkaloids ? Give two biological action of alkaloids.

GROUP – B

Answer all questions :

2. (a) Discuss the reduction of nitrobenzene in differet medium. 6
- (b) Discuss the effect of substituents and solvent on Basicity of amines. 6

Or

Write notes on the following : 4 × 3

- (i) Hoffmann's exhaustive methylation
- (ii) Mannich reaction
- (iii) Carbyl amine reaction.
3. (a) Explain any two methods of preparation of phenanthrene. 6

(b) Write notes on : 3 × 2

(i) Sandmeyer reaction

(ii) Coupling reaction.

Or

How benzene diazonium chloride is prepared from aniline ? Discuss the synthesis of fluoro-benzene, biphenyl and para-hydroxy azobenzene from benzene diazonium chloride. 3 + 3 + 3 + 3

4. How will you synthesise Isoquinoline by the following :

(a) Pictet-Spengler synthesis.

(b) Pomeranz-Fritsch synthesis

What are the oxidation products of Isoquinoline ? 4 + 4 + 4

Or

Discuss the synthesis of Thiophene from

(4)

furoic acid and acetylene. How does it reacts with :

3 + 3 + 3 + 3

(a) Formaldehyde in HCl

(b) Bromine.

5. Elucidate the structure of Hygrine and confirm the structure by synthesis. Discuss its medicinal importance.

10 + 2

Or

Establish the structure of α -terpined along with its synthesis.

12

Total Pages—4

**4th SS—CHEM(Core-X)
(Reg)**

2019

CHEMISTRY

(Physical Chemistry-IV)

[Core]

Paper — X

Full Marks : 60

Time : $2\frac{1}{2}$ hours

Answer all questions

The figures in the right-hand margin indicate marks

GROUP — A

1. Answer the following : 3 × 4

(a) Explain on electrolysis of aq. solution NaCl give H_2 and Cl_2 but K_2SO_4 give H_2 and O_2 at their respective electrode.

(Turn Over)

- (b) Define Diamagnetism and Paramagnetism.
- (c) Explain the conductance of the strong electrolyte increases on dilution although the degree dissociation (α) always equal to one at any dilution.
- (d) How does the ionic product of water is determined by conductance measurement ?

GROUP – B

Answer all questions

2. Derive the Nernst equation for the given electro-chemical cell. From emf measurement deduce the free energy, enthalpy and entropy of a cell reaction. 4 + 8

Or

Write notes on : 4 × 3

- (i) Faraday law of electrolysis
- (ii) Electrochemical series
- (iii) Quinone-Hydroquinone electrode.

3. What do you mean by liquid junction potential. How does it determined and how does it is eliminated ? 2 + 8 + 2

Or

Write notes on : 6 + 6

- (i) Molecular polarizability
 - (ii) Magnetic susceptibility.
4. Define specific conductance, equivalent conductance and molar conductance. How does these conductances are related. The resistance of 0.01 (N) $\text{Al}_2(\text{SO}_4)_3$ electrolyte is 0.001 ohm^{-1} having cell constant 0.01 cm^{-1} . Calculate it molar constance. 6 + 3 + 3

Or

Derive the Debye-Hückle equation for strong electrolyte and discuss its limitation. 12

5. What do you mean by transport number ? How does it relate with ionic mobilities. Determine the transport number by Hittorf method. 2 + 2 + 8

(Q4)

Or

How does conductance of an electrolyte is determined? Discuss the various kinds of conductometric titrations. 6 + 6

Total Pages—4

4th SS—PHY (GE-IV)
(Reg)

2019

PHYSICS

(*Electricity, Magnetism and EMT*)

[Generic Elective]

Paper — IV

Full Marks : 60

Time : $2\frac{1}{2}$ hours

Answer all questions

The figures in the right-hand margin indicate marks

SECTION — A

1. Answer *all* questions :

3 × 4

(a) State Gauss-divergence theorem.

(b) Define 1 volt of electric potential. What is the difference between volt and stat volt ?

(Turn Over)

- (c) Define magnetic permeability and susceptibility.
- (d) How the electric displacement vector related with electric field strength ?

SECTION – B

Answer all questions

2. (a) Define gradient of a scalar field and prove that gradient of a scalar field is a vector field. If $\vec{F} = x\hat{i} - y\hat{j} + z^2\hat{k}$ then find $\int_C \vec{F} \cdot d\vec{r}$ from $t=0$ to $t=1$. If curve C is given by $x=t$, $y=t^3$, $z=t^2$ and $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$. 2 + 5 + 5

Or

- (b) What is meant by curl of a vector field ? What is its physical significance ? Prove that $\text{curl grad } \phi = 0$. 3 + 4 + 5

3. (a) What do you mean by Electric flux ? When the flux will be positive, negative or zero ?

State Gauss law of electrostatics and prove it when the charge is situated inside the surface.

3 + 3 + 6

Or

(b) Find an expression for the capacity of a cylindrical condenser. Find the total capacity when two capacitors of capacities $400 \mu\text{F}$ and 0.3 mF are connected in series.

9 + 3

4. (a) Derive an expression for Ampere's circuital law. Using Ampere's circuital law show that $\text{curl } \vec{B} = \mu_0 \vec{J}$.

8 + 4

Or

(b) What do you mean by self induction and mutual induction? Find an expression for the mutual induction of two long solenoids.

3 + 3 + 6

5. (a) What is the equation of continuity? Show that equation of continuity, $\text{div } \vec{J} + \frac{\partial \rho}{\partial t} = 0$ is contained in Maxwell's equations.

8 + 4

(4)

Or

(b) What is plane electromagnetic wave ? How are values of E and B are related in it ? 6 + 6

Total Pages—3

4th SS—CHEM(SEC-II)
(Reg)

2019

CHEMISTRY

(Pharmaceutical Chemistry)

[SEC]

Paper —II

Full Marks : 40

Time : 2 hours

Answer all questions

The figures in the right-hand margin indicate marks

GROUP — A

- 1. Answer all the questions :** $2\frac{1}{2} \times 4$
- (a) What are antipyretic agents. Give two examples.**
- (b) What are meant by central nervous system agents, explain with at least one example.**

(Turn Over)

(c) Explain antiviral agents with suitable examples.

(d) Briefly discuss on 'antibiotics'.

GROUP – B

Answer all questions :

2. What are antifungal agents. Discuss their general mode of action and synthesis of any one such agent. 3 + 2 + 5

Or

Write notes on : 5 + 5

- (i) Cardiovascular
- (ii) antileprosy drugs

3. Give notes on : 5 × 2

- (i) HIV-AIDS related drugs
- (ii) Anti-bacterials.

Or

Give a detailed account of chloramphenicol. 10

4. What do you mean by aerobic and anaerobic fermentation ? How can you produce ethanol and citric acid.

5 + 5

Or

Mention synthesis of :

5 + 5

(i) Penicillin

(ii) Vitamin-C.